OFFICE OF NAVAL INTELLIGENCE,
PART I: GENERAL INFORMATION SERIES, NO. XVI.

INFORMATION FROM ABROAD.

64252

NOTES

ON

NAVAL PROGRESS.

OCTOBER, 1896.

NAVY DEPARTMENT,
OFFICE OF NAVAL INTELLIGENCE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1896.

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INTRODUCTION.

The Secretary of the Navy has directed that the information from abroad shall be published in parts, each part being published whenever sufficient information is collected to warrant publication. The parts when bound together will form the annual Notes on the Year's Naval Progress.

In this manner it is intended to place the information before the service at the earliest possible date and at the same time to retain the annual as a book of reference.

The notes on ships, torpedo boats, ordnance, and armor contain the information received since No. XV was sent to the Government Printing Office.

RICHARD WAINWRIGHT,
Chief Intelligence Officer.

NAVY DEPARTMENT, *October, 1896.*

I.

NOTES ON SHIPS AND TORPEDO BOATS.

By Lieut. H. M. WITZEL, United States Navy,
Staff Intelligence Officer.

ARGENTINA.

TORPEDO BOATS.

SANTA FE.

(Page 14, No. XV.)

This torpedo boat, brought to her load water line by a load of 35 tons, had an official three hours' full-speed trial on July 9, 1896, during which a mean speed of 26.5 knots was obtained.

AUSTRIA.

STEAM TRIALS.

MAGNET.

(Page 16, No. XV.)

This torpedo vessel had a three hours' forced-draft trial early in July, 1896, during which a mean speed of 26 knots was obtained. Displacement, 510 tons.

Motive power.—Two triple-expansion engines of 6,000 I. H. P.; four boilers.

TORPEDO BOATS.

NATTER.

(Page 17, No. XV.)

This torpedo boat, in a three hours' trial and carrying 26.2 tons additional weight, attained a mean speed of 26.5 knots.

BRAZIL.

VESSELS LAUNCHED.

BARROZO.

(Page 18, No. XV.)

The first of the three protected cruisers, building by Messrs. Armstrong, Mitchell & Co., was launched on August 25, 1896, and named the *Barrozo.*

CHILE.

STEAM TRIALS.

ALMIRANTE SIMPSON.

(Page 22, No. XV.)

The official speed trials of this torpedo vessel were held on July 23, 1896. The mean speed of six runs over the measured mile was 21.5 knots; of the three hours' forced-draft trial, 21.25 knots. The six hours' natural-draft trial gave a mean speed of 17.75 knots.

DENMARK.

VESSELS PROPOSED, AUTHORIZED, AND BUILDING.

HERLUF TRALLE.

The plans of a new coast-defense vessel of about 5,000 tons displacement, to be named the *Herluf Tralle*, have been approved. Its construction will soon be begun at the royal dockyard at Copenhagen.

FRANCE.

VESSELS PROPOSED.

Proposals are invited for the construction, at a private yard, of one protected cruiser of 5,300 tons displacement and a speed of 23 knots.

Two sheathed cruisers of 2,450 tons displacement and a speed of 20.5 knots are to be built; one at Rochefort, the other at a private yard.

VESSELS LAUNCHED.

SAINT LOUIS.

(Page 45, No. XIII; 29, No. XV.)

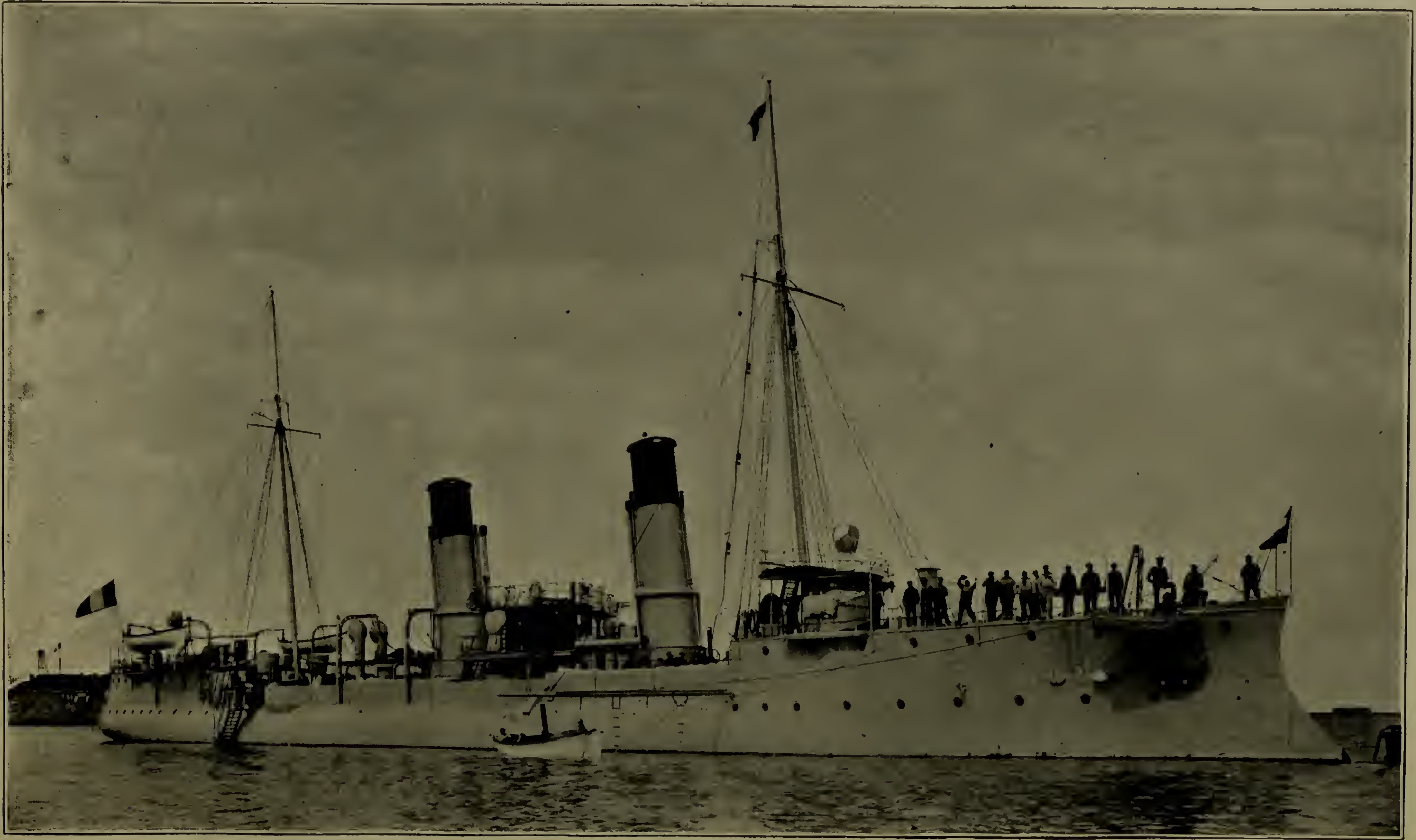
This battleship, sister ship of the *Charlemagne*, was launched at Lorient on September 8, 1896.

STEAM TRIALS.

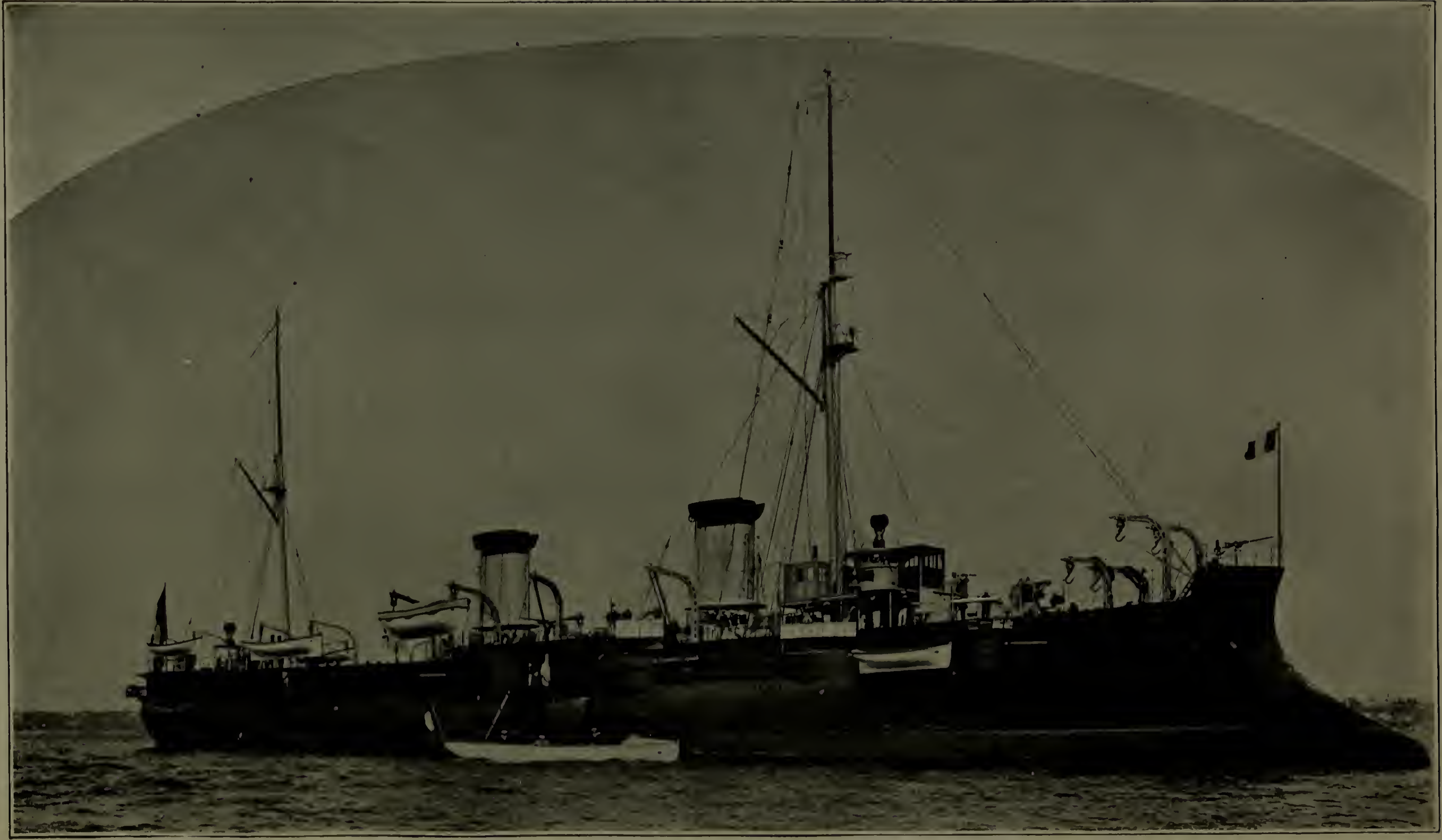
BRUIX.

(Page 21, No. XIV.)

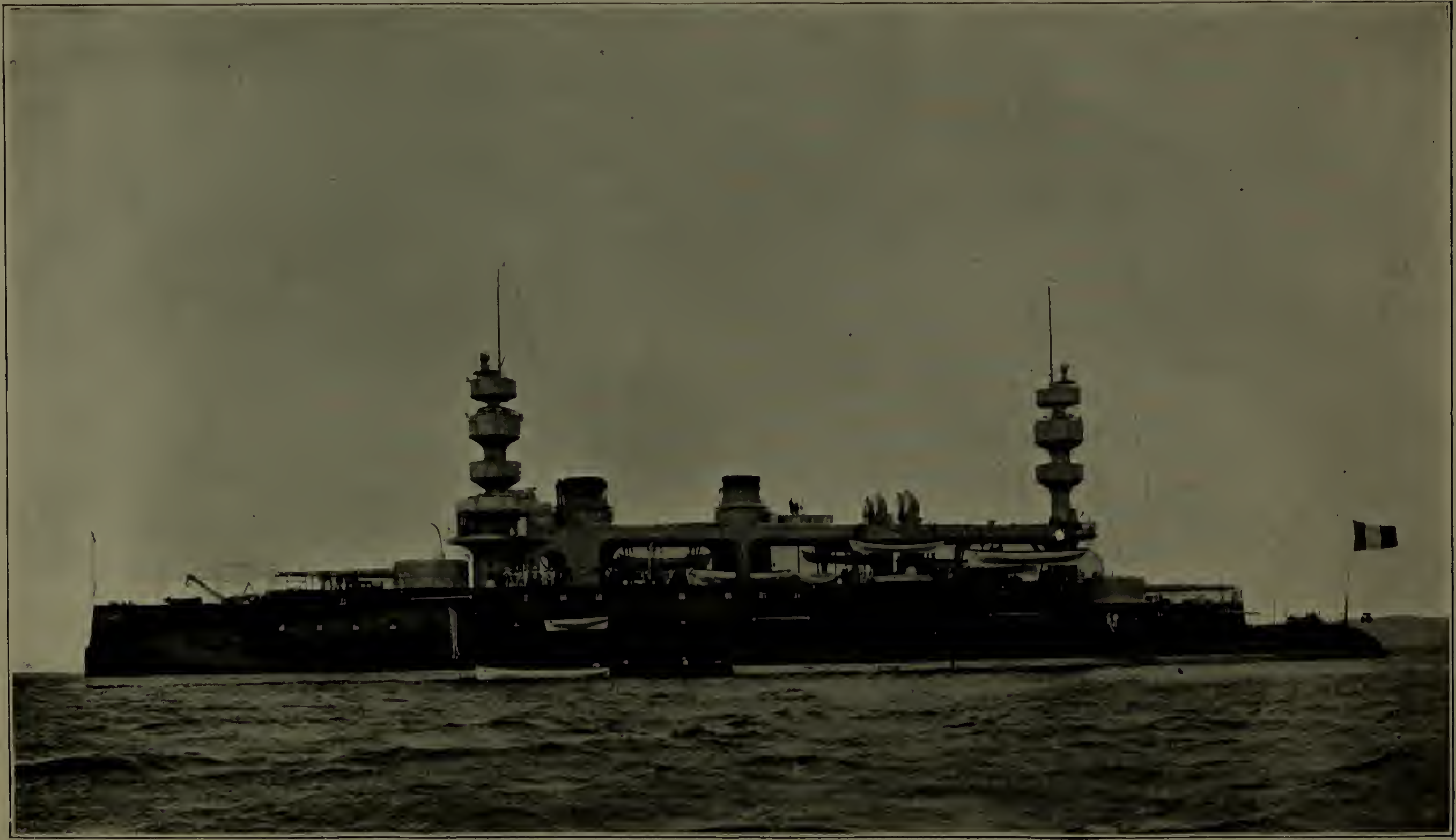
In a preliminary natural-draft trial off Rochefort, in July, 1896, the engines developed 7,210 H. P.



CASSINI. (Page 38, No. XV.)



DESCARTES.



CHARLES MARTEL.

CHARLES-MARTEL.

(Page 36, No. XV.)

In an official reduced-power trial off Brest, on August 11, this vessel attained a mean speed of 10.6 knots; I. H. P., 2,150; coal consumed per I. H. P. per hour, 1.7 pounds; number of revolutions, 52.5. On August 14, with 1,050 I. H. P. and 39.5 revolutions, she attained a speed of 8.3 knots; coal consumed per I. H. P. per hour, 1.92 pounds.

DESCARTES.

(Page 37, No. XV.)

A series of reduced-power trials gave the following results:

August 11: I. H. P., 915; number of revolutions, 62; coal consumed per I. H. P. per hour, 1.69 pounds; speed, 10 knots.

August 14: I. H. P., 1,725; number of revolutions, 83; coal consumed per I. H. P. per hour, 1.39 pounds; speed, 13.5 knots.

August 19 (10-knot trial with one engine): I. H. P., 890; number of revolutions, 74; coal consumed per I. H. P. per hour, 1.53 pounds; speed, 10.2 knots.

VESSEL RE-ARMED.

REQUIN.

(Page 39, No. XV.)

The *Requin* is the only vessel of her class that will be re-armed. The expense of the change is considered too high for the advantages gained.

VESSELS STRUCK FROM THE LIST.

The *Bobillot*, *Cuvellier*, *Raynaud*, and *Triomphante* are struck from the list of "bâtiments de mer" and put on the first part of the "Liste de la flotte." The *Béliers* and *Villars* are struck from the first part of the "Liste de la flotte."

GERMANY.

TORPEDO BOATS.

(Page 50, No. XV.)

The torpedo division boat building by Thornycroft will have twin screws, driven by two independent engines.

GREAT BRITAIN.

VESSELS AUTHORIZED AND BUILDING.

CANOPUS AND CLASS.

(Page 51, No. XV.)

The five vessels of the *Canopus* class are to be named *Canopus*, *Ocean*, *Goliath*, *Glory*, and *Albion*. The first is to be built at Portsmouth, the second at Devonport, the third at Chatham; the *Glory* will be built by

Messrs. Laird Bros., and the *Albion* by the Thames Iron Works and Shipbuilding Company.

The contract for the propelling machinery of the *Canopus* has been given to Messrs. Scott & Co., Greenock. There are to be two sets of triple-expansion engines capable of developing 13,500 collective horse-power, steam to be furnished by 20 boilers of the Belleville type. The propelling machinery of the *Ocean* will be built by Messrs. Hawthorn, Leslie & Co.; that of the *Goliath* by Messrs. John Penn & Sons; that of the *Glory* by Messrs. Laird Bros., and that of the *Albion* by Messrs. Maudslay, Sons & Field.

POMONE.

(Page 50, No. XV.)

The construction of the third-class cruiser authorized in the naval estimates for 1896–97, to be built at a navy-yard, will be begun at Sheerness on the slip of the *Proserpine* as soon as the latter is launched. The new cruiser will be named the *Pomone.*

Dimensions.—Length, 300 feet; beam, 36.5 feet; mean load draught, 13.5 feet; displacement, 2,135 tons.

Motive power.—Engines, in two compartments, of 7,000 I. H. P. under forced draft, and 5,000 I. H. P. under natural draft; eight water-tube boilers in two compartments; coal capacity, 550 tons; estimated speed under forced draft 20 knots, under natural draft 18.5 knots.

Protection.—Steel protective deck, running the entire length of the vessel, with a maximum thickness of 2 inches over the engines and boiler rooms.

Armament.—Eight 4-inch R. F. guns: Two on forecastle, two on poop, and two on each broadside; eight 3-pounder Hotchkiss R. F. guns; two Maxim machine guns, caliber 0.45; two 14-inch torpedo tubes.

VESSELS LAUNCHED.

CÆSAR AND ILLUSTRIOUS.

(Page 36, No. XIV.)

These vessels, sister ships to the *Magnificent*, were floated out of dock as follows: The *Cæsar* at the Portsmouth Navy-Yard, where her keel was laid on March 25, 1895, on September 2, 1896; and the *Illustrious*, at the Chatham Navy-Yard, where her keel was laid on March 18, 1895, on September 17, 1896.

STEAM TRIALS.

PRINCE GEORGE.

(Page 51, No. XV.)

The eight hours' natural-draft trial was carried out on September 8, 1896. Ship's draught: 24 feet 11 inches, forward; 25 feet 2 inches, aft Steam pressure in boilers, 150.7 pounds; vacuum, 25.7 inches starboard, 25.5 inches port; air pressure in fire room, 0.44 inches. Mean I. H. P., 10,464; number of revolutions, 97; coal consumed per I. H. P. per hour, 2.3 pounds. Speed, by patent log, 16.52 knots.

The four hours' forced-draft trial was carried out on September 14, 1896. Ship's draught: 24 feet 9 inches, forward; 25 feet 3 inches, aft. Steam pressure in boilers, 152.3 pounds; vacuum, 26.4 inches starboard, 26.3 inches port; air pressure in fire room, 1.2 inches. Mean I. H. P., 12,253: Starboard, 6,104; port, 6,149. Mean number of revolutions: Starboard, 101.56; port, 101.98. Speed, by patent log, 18.3 knots.

The thirty hours' coal-consumption trial was completed on September 18, 1896. Ship's draught: 24 feet 6 inches, forward; 25 feet, aft. Steam pressure in boilers, 137 pounds; vacuum, 27.8 inches starboard, 27.5 inches port. Mean I. H. P., 6,211. Mean number of revolutions: Starboard, 83; port, 82.8. Coal consumed per I. H. P. per hour, 1.7 pounds. Average speed, 14.76 knots.

VENUS.

(Page 52, No. XV.)

In the eight hours' natural-draft trial the mean I. H. P. developed was 8,204, and the average speed 19.25 knots.

In the four hours' forced-draft trial the mean I. H. P. developed was 9,774, and the average speed 20.18 knots.

In the thirty hours' coal-consumption trial the mean I. H. P. developed was 4,876, and the average speed 16.8 knots. Coal consumed per I. H. P. per hour, 1.6 pounds.

VICTORIOUS.

(Page 51, No. XV.)

In the eight hours' natural-draft trial, on August 31, 1896, the mean I. H. P. developed was 10,316; average number of revolutions per minute, 98.6; mean draught, 25 feet 8 inches; mean speed, 16.92 knots.

In the four hours' forced-draft trial, on September 2, 1896, the mean I. H. P. developed was 12,201; average number of revolutions per minute, 105.3; mean draught, 25 feet 2 inches; mean speed, 18.7 knots.

In the thirty hours' coal-consumption trial, on September 4 and 5, 1896, the mean I. H. P. developed was 6,205; average number of revolutions per minute, 86.9; mean draught, 25 feet 1 inch; mean speed, 14.9 knots.

VESSELS REFITTING, ETC.

The Admiralty have ordered the stern torpedo tubes to be taken out of all ships of the *Royal Sovereign* class.

The protected cruiser *Eclipse* (p. 56, XV) is to have her masts fitted with military tops, carrying five 3-pounder R. F. guns.

The torpedo service vessel *Skipjack* is to receive new water-tube boilers at Chatham.

VESSELS SOLD OR STRUCK FROM THE LIST.

Heroine to be sold. *Hyacinth* struck from the list.

TORPEDO BOATS.

ROCKET.

(Page 64, No. XV.)

Guards have been fitted to the after part of the hull of the *Rocket* to protect the propellers, and it has been found that they do not appreciably affect her speed. It has been decided to supply similar fittings to all vessels of the class.

SPITFIRE.

(Page 63, No. XV.)

The average speed attained by this vessel during six runs over the measured mile was 27.775 knots. During the three hours' trial the boiler pressure was 195 pounds; mean I. H. P., 4,527; mean number of revolutions per minute, 398; average speed, 27.461 knots.

ITALY.

The *Giuseppe Garibaldi II* (p. 65, No. XV) has been sold to Spain by the contractors and renamed the *Cristobal Colon.*

VESSEL LAUNCHED.

CARLO ALBERTO.

(Page 66, No. XV.)

This vessel was launched at Spezia on September 23, 1896.

NORWAY.

VALKYRIEN.

(Page 75, No. XV.)

The principal characteristics of this torpedo vessel, built by Schichau, at Elbing, are as follows:

Dimensions.—Length between perpendiculars, 190.2 feet; greatest breadth of beam, 24.3 feet; mean draught, 9.2 feet; displacement, 380 tons.

Motive power.—Two triple-expansion engines, similar to the one of the Austrian torpedo boat *Natter*, and two Thornycroft boilers carrying a working pressure of 285 pounds. Coal capacity, 90 tons.

Armament.—One 7-centimeter R. F. gun forward, one 7-centimeter R. F. gun aft, and two 47-millimeter R. F. guns in broadside. Two torpedo tubes for 45-centimeter Schwartzkopff torpedoes, one amidship and one aft.

The vessel has a ram bow. There is a low topgallant forecastle, and abaft it is the conning tower with the bridge above it. There are two pole masts, with a signal yard on the foremost. The two smoke pipes are far apart, the forward one being just abaft the conning tower.

Steam trial.—During the three hours' trial on May 11, 1896, the mean I. H. P. developed was 3,300; mean number of revolutions per minute, 240; average speed, 23.2 knots. On her passage to Horten, during very stormy weather, she proved herself to be an excellent sea boat.

PORTUGAL.

VESSELS PROPOSED.

Bids were asked for, on June 26, for the construction of one protected cruiser of about 3,600 tons, two cruisers of about 1,800 tons, and one sea-going tug of about 400 tons displacement. Bids were opened on August 26. The principal characteristics demanded are as follows:

PROTECTED CRUISER OF 3,600 TONS.

Hull.—To be of steel, wood and copper sheathed, divided into watertight compartments; double bottom at least under engine and boiler space; maximum draught of water, 19 feet 8 inches.

Motive power.—Two vertical, triple-expansion engines; twin screws of manganese bronze; water-tube boilers. Normal coal capacity, 700 tons, with bunker space for at least 300 tons additional. The mean speed during six hours' trial shall be 20 knots with natural draft and 22 knots with forced draft.

Protection.—Protective deck of soft steel, extending from end to end; minimum thickness at the crown, 1.6 inches; on the slopes, 4.3 inches. Conning tower of steel plates not less than 3.9 inches thick; gun shields, 3 inches.

Armament.—To be of R. F. guns; four 5.9-inch, eight 4.7-inch, twelve 47-millimeter, six 37-millimeter, four machine guns, and five torpedo tubes, of which three shall be submerged. The ammunition supply shall be 150 rounds for each 5.9-inch and 4.7-inch piece, and 300 rounds for each of the other pieces.

TWO CRUISERS OF 1,800 TONS.

Hull.—To be of steel, wood and copper sheathed, divided into watertight compartments; maximum draught of water, 13 feet 9 inches.

Motive power.—Two vertical, triple-expansion engines; twin screws of manganese bronze; water tube boilers. The mean speed during a six hours' natural-draft trial, in a smooth sea, shall be 15 knots.

Armament.—Two 5.9-inch R. F., four 4.7-inch R. F., eight 47-millimeter R. F., two machine guns, and two torpedo tubes. The ammunition supply shall be 150 rounds for each of the 5.9-inch and 4.7-inch guns and 300 rounds for each of the 47-millimeter guns.

SPAIN.

VESSELS PROPOSED, AUTHORIZED, OR BUILDING.

CRISTOBAL COLON AND PEDRO ARAGON.

Spain has bought of the contractors, Ansaldo & Co., near Genoa, the armored cruiser *Giuseppi Garibaldi II*, laid down for Italy (p. 65, XV), and renamed her the *Cristobal Colon*. She is to be delivered complete in February, 1897.

A contract with the same firm of builders has also been prepared for the construction of a new vessel of the same type as the above to be named the *Pedro Aragon*. She is to be delivered in fifteen months.

These armored cruisers are of the same type as the Argentine vessel *José Garibaldi* (p. 9, XIV), but instead of eight cylindrical Scotch boilers they are to have sixteen of the Belleville type.

TORPEDO VESSELS.

The torpedo vessels referred to on page 87, No. XV, have been named the *Audaz* and *Osado;* two similar vessels, authorized in the buget for 1896 (p. 84, XV), have been ordered from the same firm.

VESSELS LAUNCHED.

PRINCESA DE ASTURIAS, CRISTOBAL COLON, AND VILLALOBOS.

The *Cristobal Colon*, armored cruiser, was launched on September 16, 1896, and the *Villalobos*, gun vessel (p. 61, XIV; 87, XV), was launched during the latter part of June, 1896.

The attempt to launch the armored cruiser *Princesa de Asturias* (p. 85, XV) on September 9, 1896, was unsuccessful; another attempt will probably be made in October.

TURKEY.

VESSELS BUILDING.

The hull of the armored cruiser *Abdul Kader* (p. 62, XIV) is nearly completed, and the protected cruiser *Hudavendikiar* (p. 62, XIV) is nearly ready for launching.

SPEED TRIALS.

PELENG-I-DERIA.

(Page 94, No. XV; 62, No. XIV; 78, XIII.)

In the official acceptance-trials this torpedo vessel attained a mean speed of 20 knots over the measured mile and a mean speed of 19 knots in a three hours' trial.

Dimensions.—Length, 236 feet 2 inches; beam, 31 feet 2 inches; displacement, 840 tons.

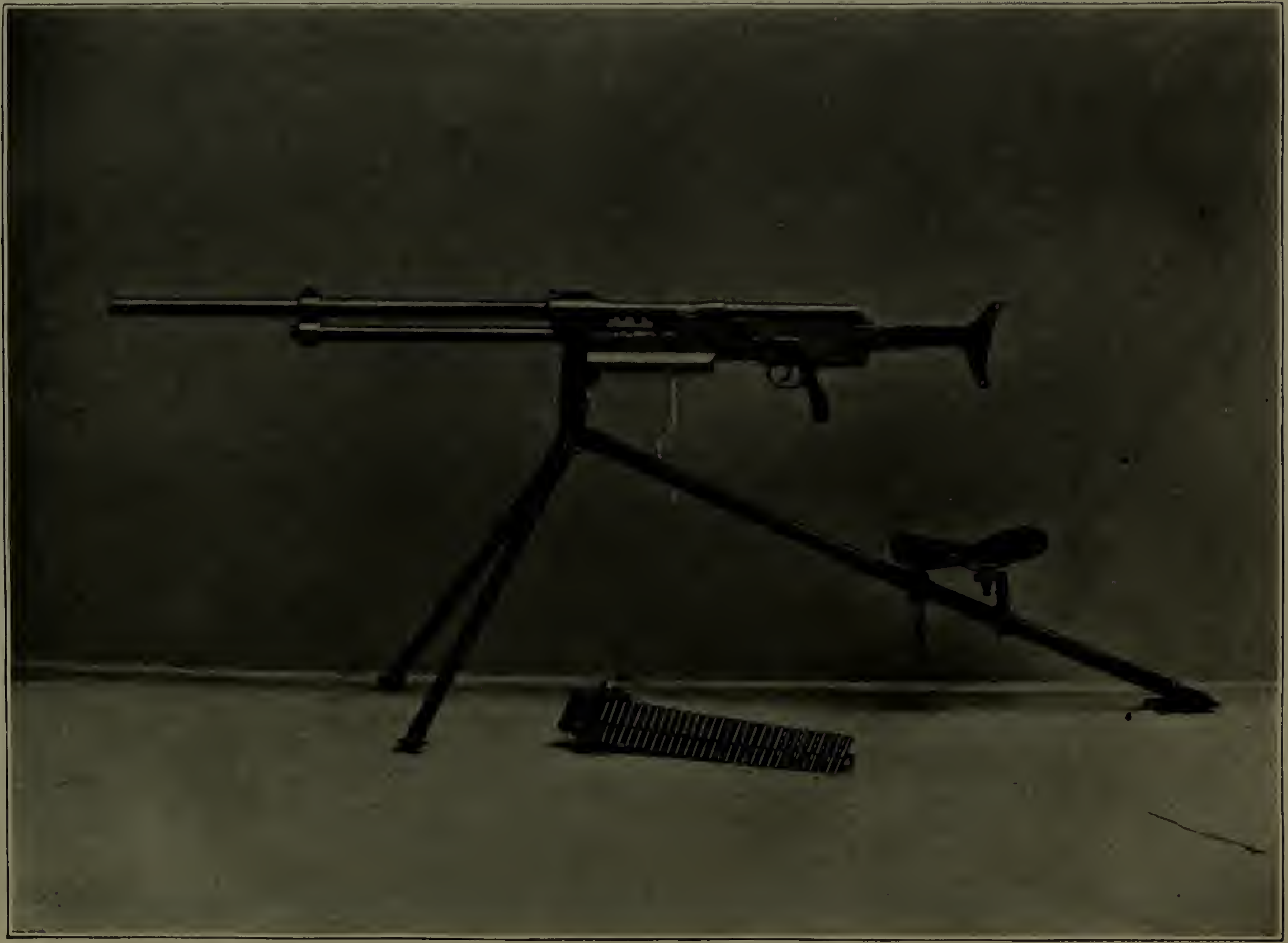


Fig. 3.—HOTCHKISS AUTOMATIC MACHINE GUN.

Fig. 1.

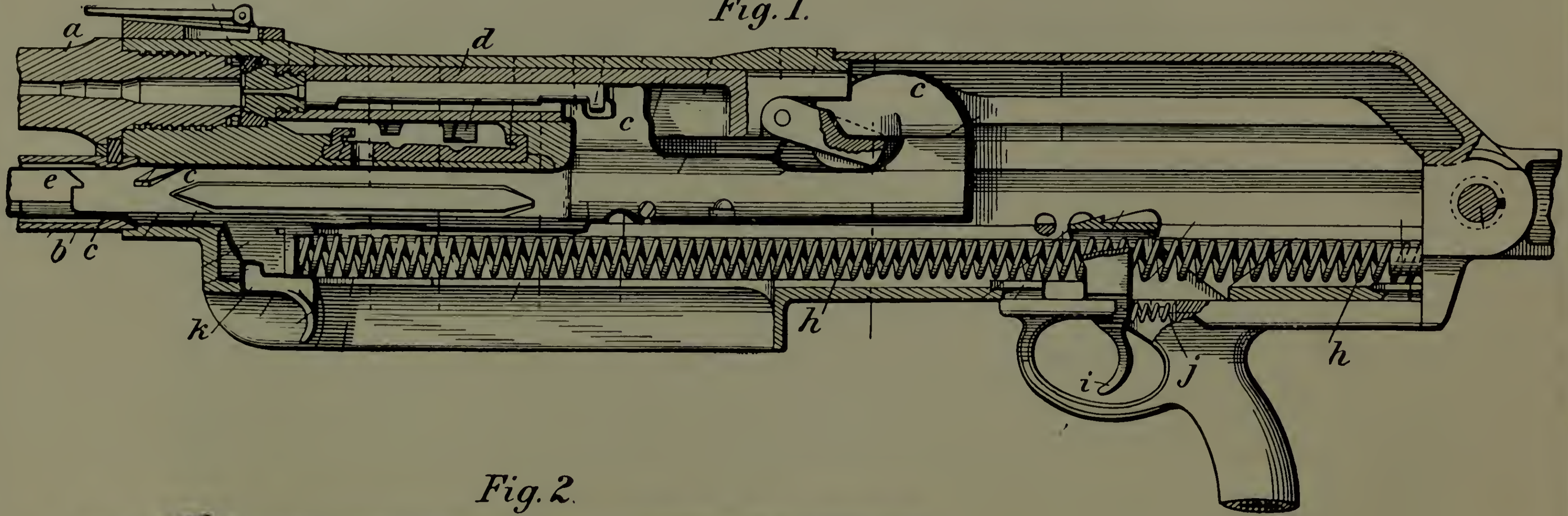
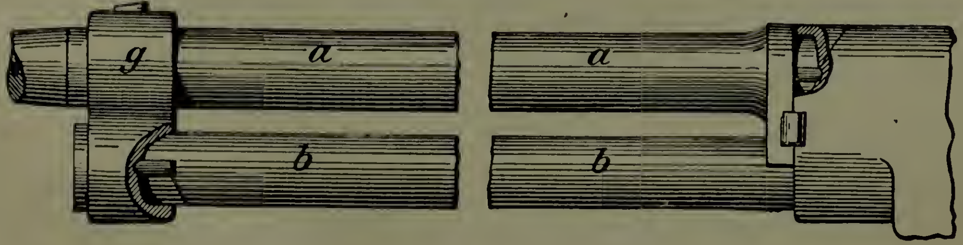


Fig. 2.



Figs. 1 and 2.—HOTCHKISS AUTOMATIC MACHINE GUN.

II.

NOTES ON ORDNANCE AND ARMOR.

By Ensign LAY H. EVERHART, United States Navy,
Staff Intelligence Officer.

GUNS AND MOUNTS.

FRANCE.

THE HOTCHKISS AUTOMATIC MACHINE GUN.

This gun is attracting much attention in Europe, where it is being tried by several Governments. The Chilean Government has it in actual service. Fig. 3 gives a general view of the gun.

"The Hotchkiss automatic machine gun belongs to that class in which a portion of the gas developed by the explosion of the powder charge is utilized for operating the breech action and feed mechanism of the arm; and more particularly to that class in which a motor piston in perpetual engagement with a power accumulator is operated by the gases resulting from the explosion. The present design produces a simple and efficient mechanism whereby, when a certain part of it is given a reciprocating motion by the action of the powder gas and a spring or other mechanical means, all the operations of loading, firing, extracting, ejecting, and cocking are automatically performed, and in proper sequence, and provides means whereby the rate of fire may be controlled or the action of the gun interrupted, and so to form all parts of the mechanism that they may be dismounted or assembled without the use of tools. In fig. 1 a longitudinal view of the mechanism is shown, while fig. 2 is an external view of portions of the barrel *a* and of the cylindrical chamber *b*, to which the gases are led for the purpose of operating the actuating piston within. The portion of the mechanism requiring the most careful study is the piston *c*, which operates the bolt *d*, and performs or provides the motive power for the various other reloading operations. It is provided with a forward extension at the end *e*, which enters the cylinder and acts in a manner similar to the piston of a steam engine. The powder gases are carried from the barrel to the forward end of this cylinder through a hole drilled in the connecting-strap *g*. The rapidity of fire of the gun may be regulated by a valve controlling the amount of gas passing through this hole. When the weapon is discharged the piston *c* is driven bodily backward against the pressure of the spring *h*. In the course of this movement the bolt *d* is drawn back, the firing-pin is set, and the empty case is ejected. On the return movement a new cartridge is carried into the chamber, and when the parts are locked in place it is discharged. This goes on as long as the gunner keeps his finger on the trigger *i*, but when the finger is removed, the sear *j*, which is connected with it, holds the piston in the rear position, and the further firing of the gun is arrested."

The cartridges are held in a light metallic clip, containing about 30, which is placed in a horizontal feeder at the left of the gun (fig. 1).

"In order to enable the gun to be loaded by hand when inserting the first cartridge, a finger-piece *k*, in the form of a trigger, is provided, and it extends downward from the piston to the exterior of the gun. By means of this the piston may be drawn back by hand, so as to set it in the position from which it may continue its action on the automatic principle described above."

There are but 31 parts to the gun.

ARMOR.

METHOD OF FUSING HOLES IN FACE-HARDENED ARMOR.

Ordinary drilling tools have been found useless for drilling the necessary holes for securing face-hardened armor. At first the attempt was made to keep the plate soft in the wake of holes by means of patches, but this was not wholly successful, and now the hard face is softened by an electric arc and the holes bored with an electric drill.

It has been found possible to actually penetrate the hard skin of the plate by fusing it with an electric arc. The carbon is fixed in a holder which can be moved up toward the plate to be drilled by a hand lever, and a shield is fitted above the carbon to screen the eyes of the man working the machine from the glare of the arc. The fixture can be bolted to a Rowan electric drilling machine, which consists of a drill worked by a small electric motor, the machine being held against the plate to be drilled by a pair of electro magnets excited by the same current that drives the motor. This forms a convenient arrangement, as the machine can be used for drilling the holes in the soft steel after the hard skin has been pierced.

The dynamo used for providing the current is a 400-ampere machine, working at 80 volts, and nearly all of the current is required, as experiment has shown that with smaller currents the hole is not well defined, and is larger than necessary at the surface.

The positive pole of the dynamo is connected to the armor plate and the negative to a thirteen-sixteenth-inch carbon. The holes formed by

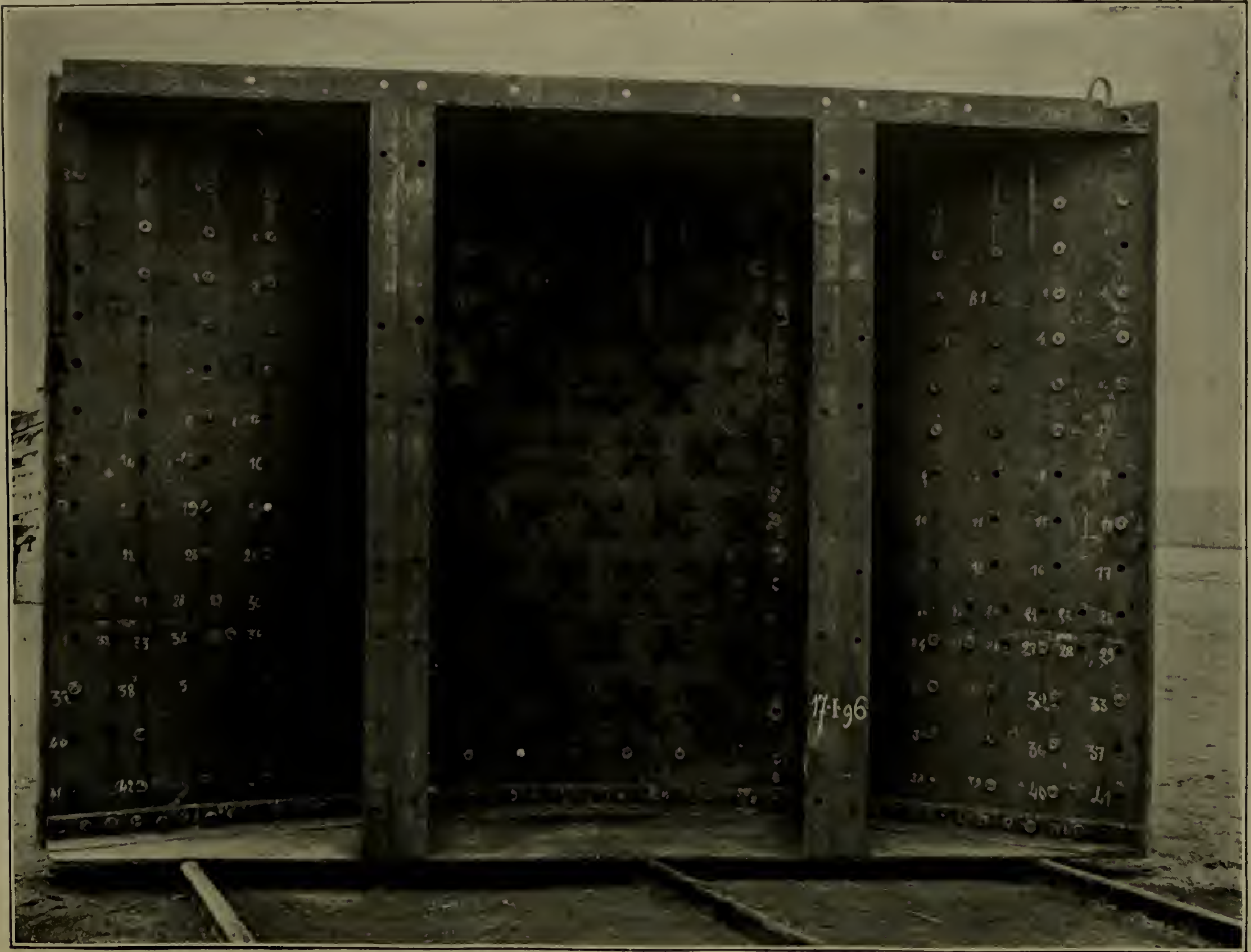
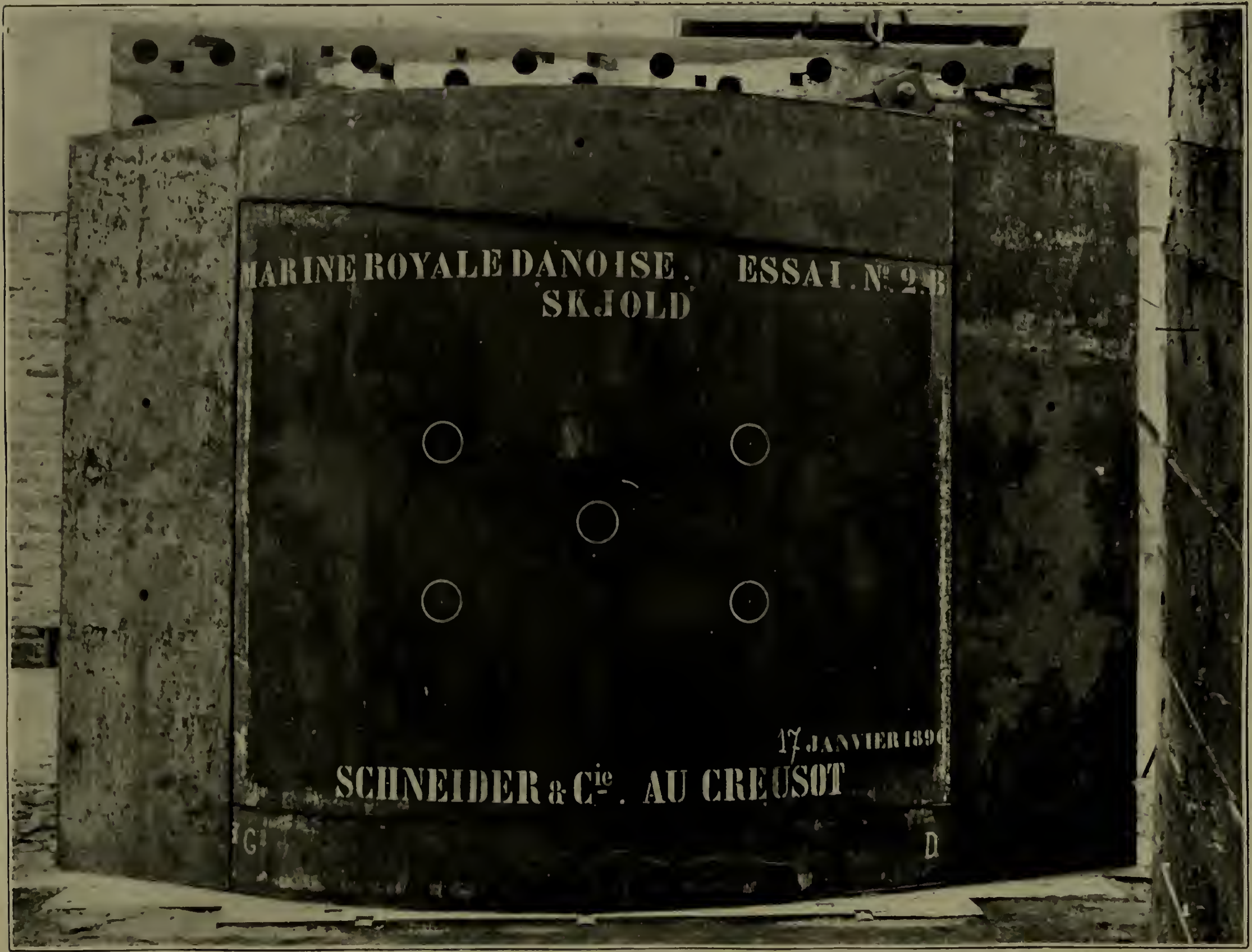


Fig. 1.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SKJOLD
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Fig. 2.

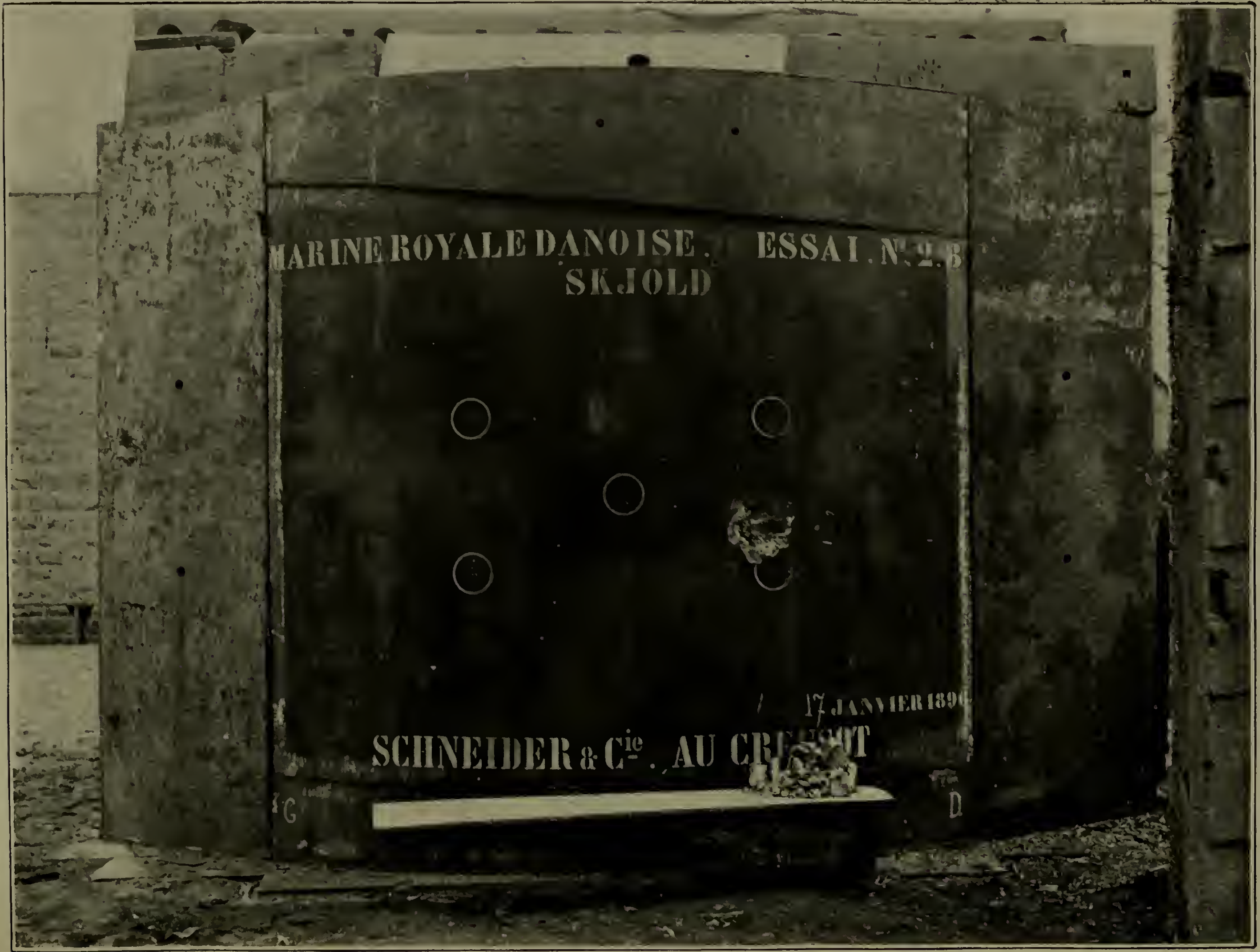
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Fig. 3.

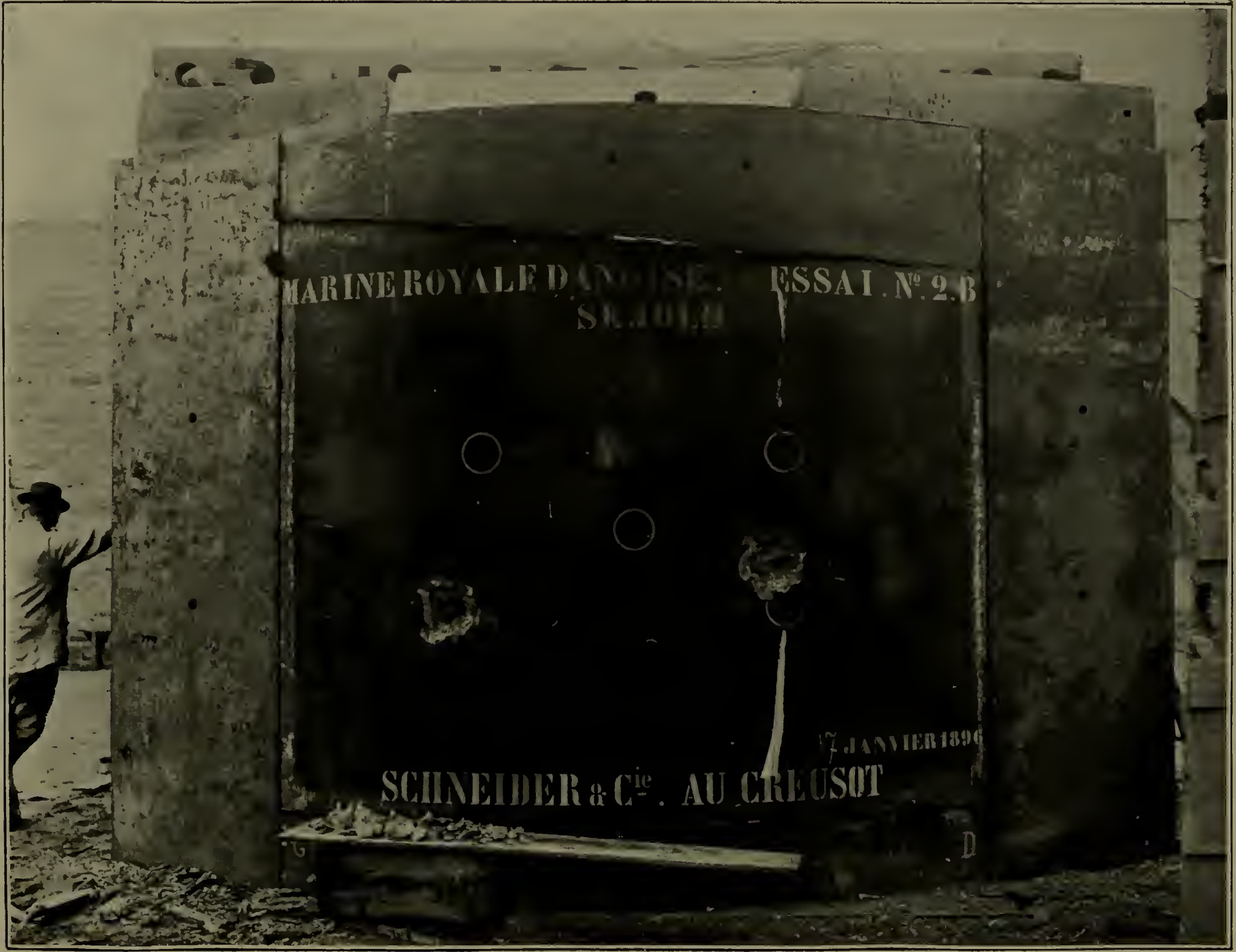
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Fig. 4.

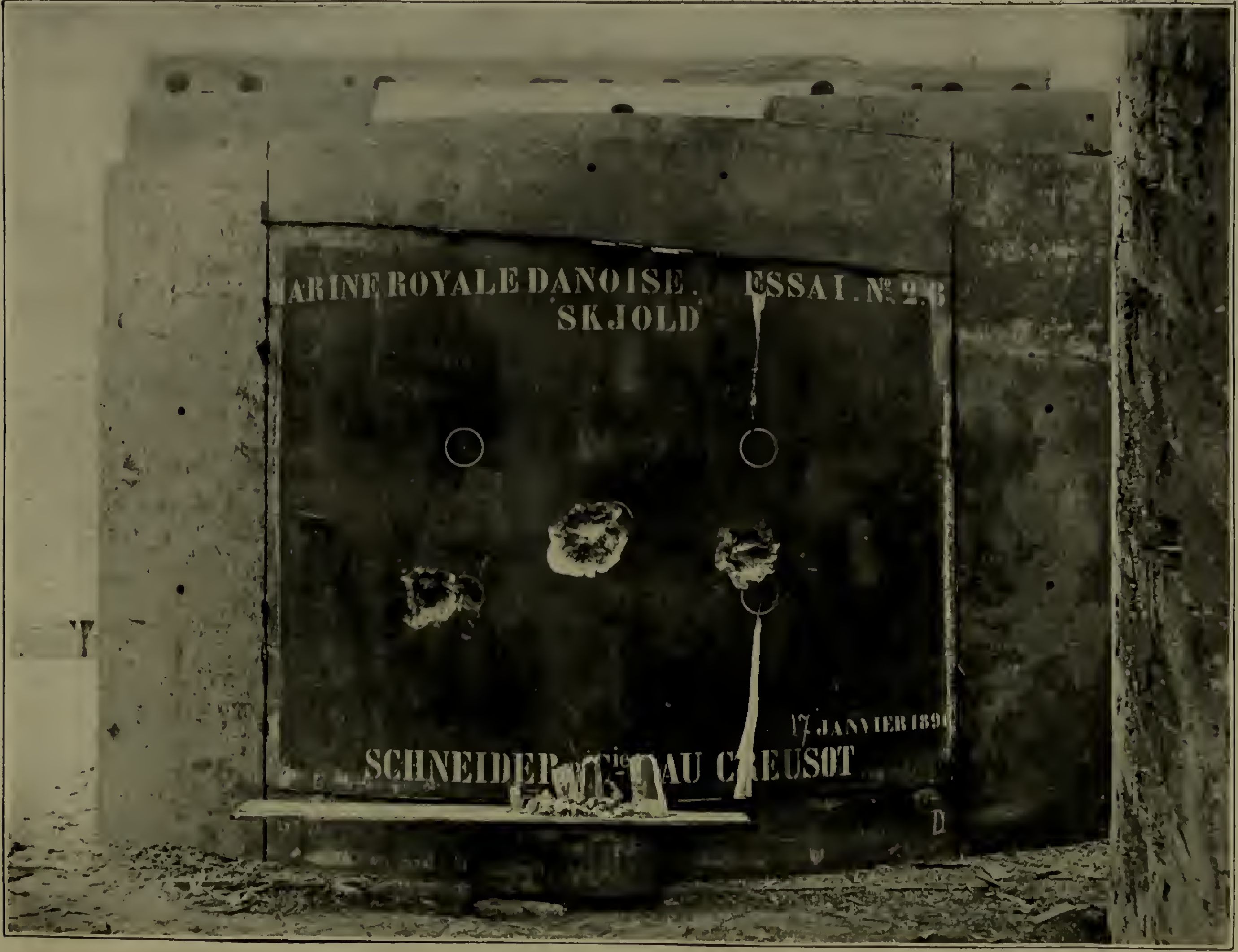
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Fig. 5.

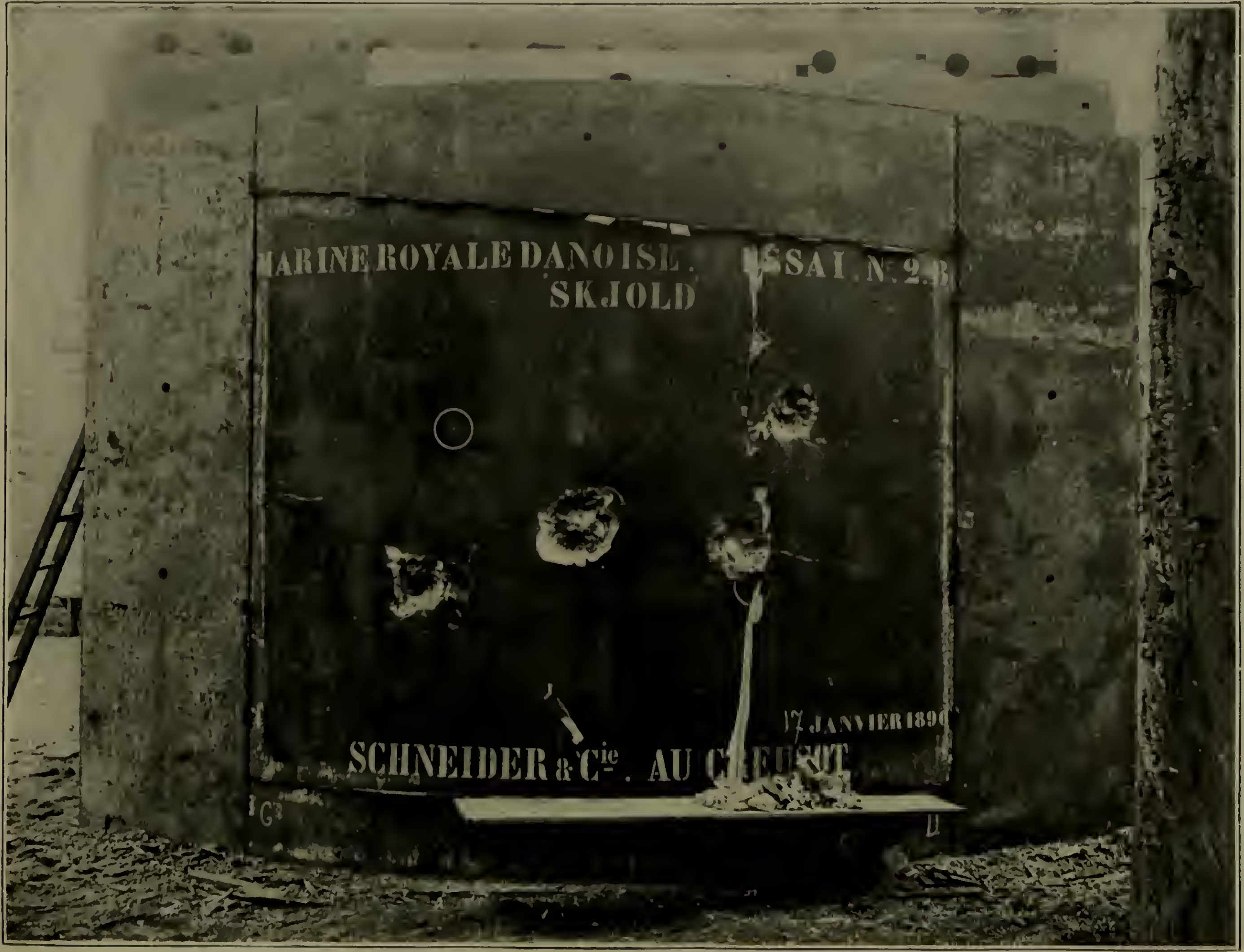
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Fig. 6.

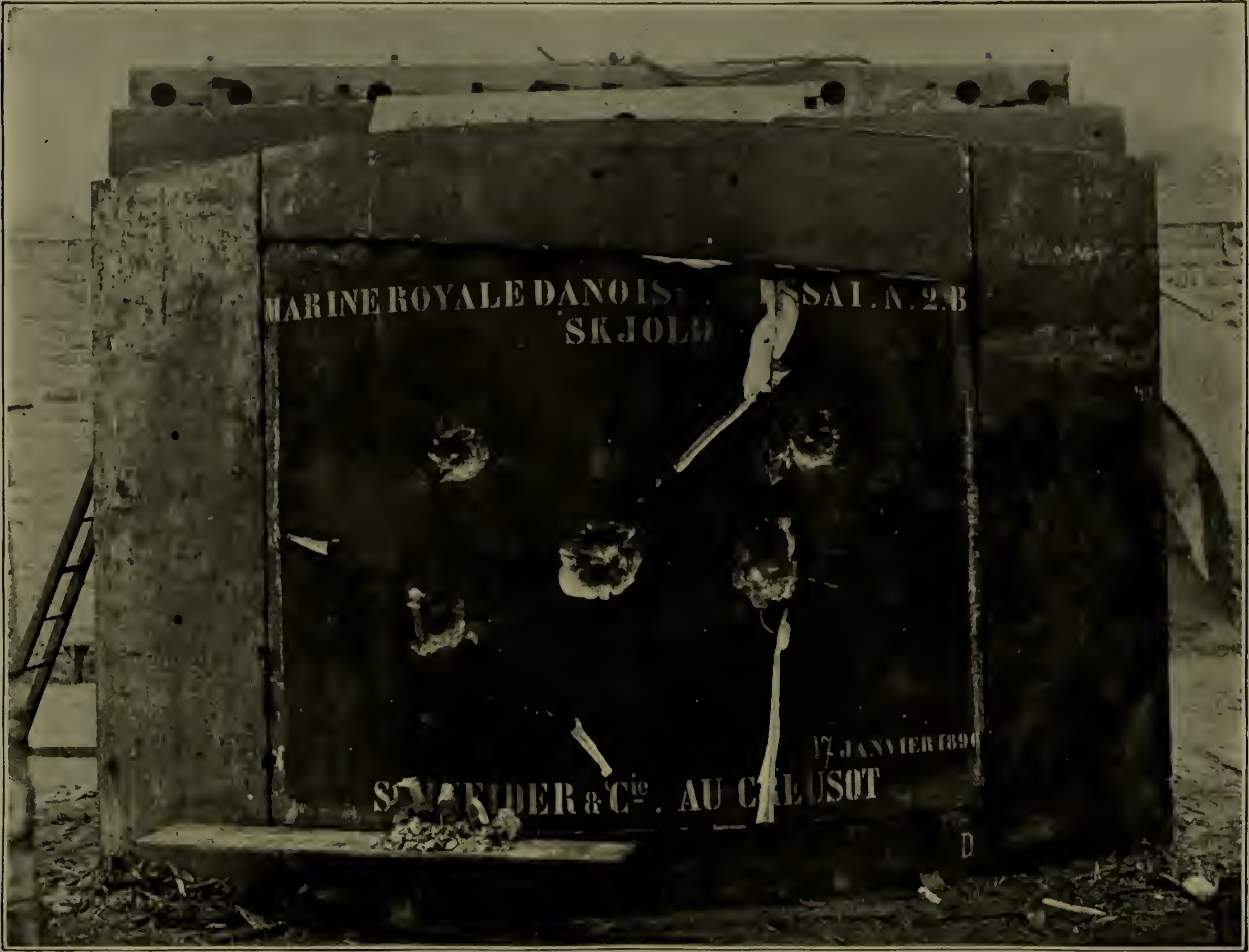
MARINE ROYALE DANOIS
ESSAI. N. 2.B
SKJOLD
17 JANVIER 189
SCHNEIDER & Cie. AU CREUSOT
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Fig. 7.

the carbon are about $1\frac{1}{4}$ inches in diameter, and are fused to a depth of about $1\frac{1}{4}$ inches, although the hard face extends only to a depth of one-half inch from the surface of the plate.

The time taken to fuse such a hole as described above with a current of 350 amperes, at 80 volts, is about forty-five seconds.

FRANCE.

CREUSOT FACE-HARDENED TURRET PLATES.

Firing trials of turret armor for the Royal Danish ship *Skiold* took place at Creusot on January 17, 1896. These plates are face-hardened nickel steel, and have these particulars: Length, 9 feet 6 inches; breadth, 7 feet 5 inches; thickness, 7.87 inches; weight, 10.65 tons. The gun used was a 5.91-inch Schneider & Co. of 45 calibers length. The projectiles were forged chrome steel Krupp of 112.4 pounds weight, and were furnished by the Royal Danish Government. Five shots were fired at the corners and center of a rectangle 3 feet, 3.4 inches by 2 feet, or spaced about 4 calibers (fig. 2). The plate was secured on the curved plate backing, representing the turret (fig. 1).

Shot No. 1.—Charge, 38.5 pounds; velocity, 2,053 foot-seconds (fig. 3).

Shot No. 2.—Charge, 38.5 pounds; velocity, 2,076 foot-seconds. An important vertical crack, apparently not very deep, was developed in the neighborhood of, and evidently originated by, the first shot (fig. 4).

Shot No. 3.—Charge, 37.4 pounds; velocity, 2,030 foot-seconds. Developed other slight surface cracks (fig. 5).

Shot No. 4.—Charge, 38.6 pounds; velocity, 2,070 foot-seconds. Increased the vertical crack developed by shots Nos. 1 and 2, and accentuated the surface cracks mentioned in No. 3 (fig. 6).

Shot No. 5.—Charge, 38.6 pounds; velocity, 2,076 foot-seconds. Increased the vertical crack and the flaking about it, and other finer cracks (fig. 7).

The projectiles in every case were stopped and smashed. The penetration can not have been great, for the backing, when stripped, showed no indentations. The projectiles did not seem to have been of high tenacious quality.

The plate is evidently of high quality, and was accepted without comment.

ITALY.

Recent trials have been made of Terni nickel-steel face-hardened armor plates. There were two plates (fig. 1), both of these dimensions: 7 feet 10.5 inchss by 5 feet 3 inches by 5.91 inches. The one to the right has four snakes in it, the one intending toward the center having a maximum depth of 0.3 inches and the others less plainly seen on the plates.

Shot No 1.—Fired at the left plate, 6-inch gun, Krupp steel projectile weighing 99.3 pounds; velocity on impact 1,968 foot-seconds. The projectile broke, fragments remaining embedded in the plate (fig. 2).

Shot No. 2.—Fired at the right plate, 6-inch gun, Krupp steel projectile, weighing 99.3 pounds; velocity on impact, 1,968 foot-seconds. The projectile broke, fragments remaining embedded in the plate (fig. 2).

Shot No. 3.—Fired at the right plate, 6-inch gun, Krupp steel projectile, weighing 99.3 pounds; velocity on impact, 2,034 foot-seconds. The projectile broke, fragments remaining embedded in the plate (fig. 3).

Shot No. 4.—Fired at the right plate, 6-inch gun, Krupp steel projectile, weighing 99.3 pounds; velocity on impact, 2,132 foot-seconds. The projectile passed entirely through the plate (fig. 3).

Shot No. 5.—Fired at left plate, 6-inch gun, Krupp steel projectile, weighing 99.3 pounds; velocity on impact, 1,213 foot-seconds. The projectile broke, fragments remaining embedded in plate. Penetration, about 2.4 inches (fig. 4).

Shot No. 6.—Fired at left plate, 6-inch gun, Krupp steel projectile, weighing 99.3 pounds; velocity on impact 1,443 foot-seconds. The projectile broke, fragments remaining embedded in plate. Penetration, about 2.8 inches (fig. 4).

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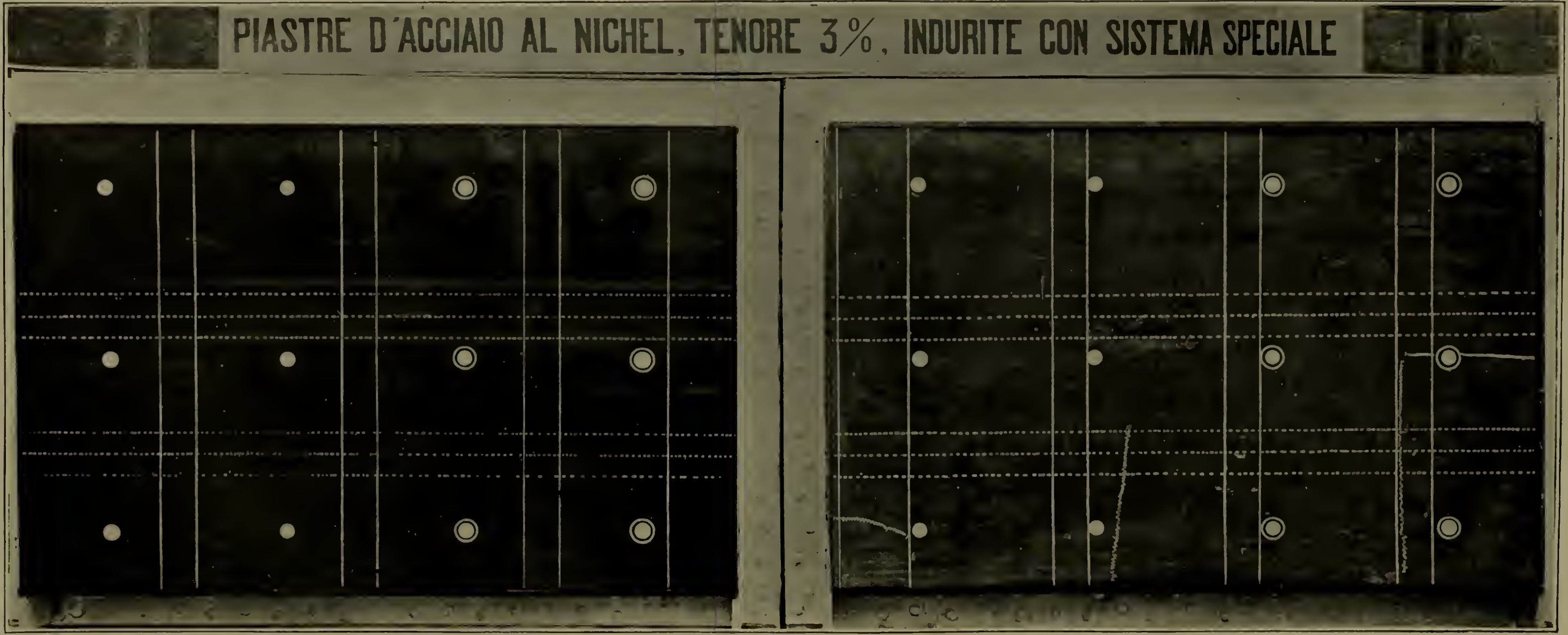
PIASTRE D'ACCIAIO AL NICHEL, TENORE 3%, INDURITE CON SISTEMA SPECIALE

Fig. 1.

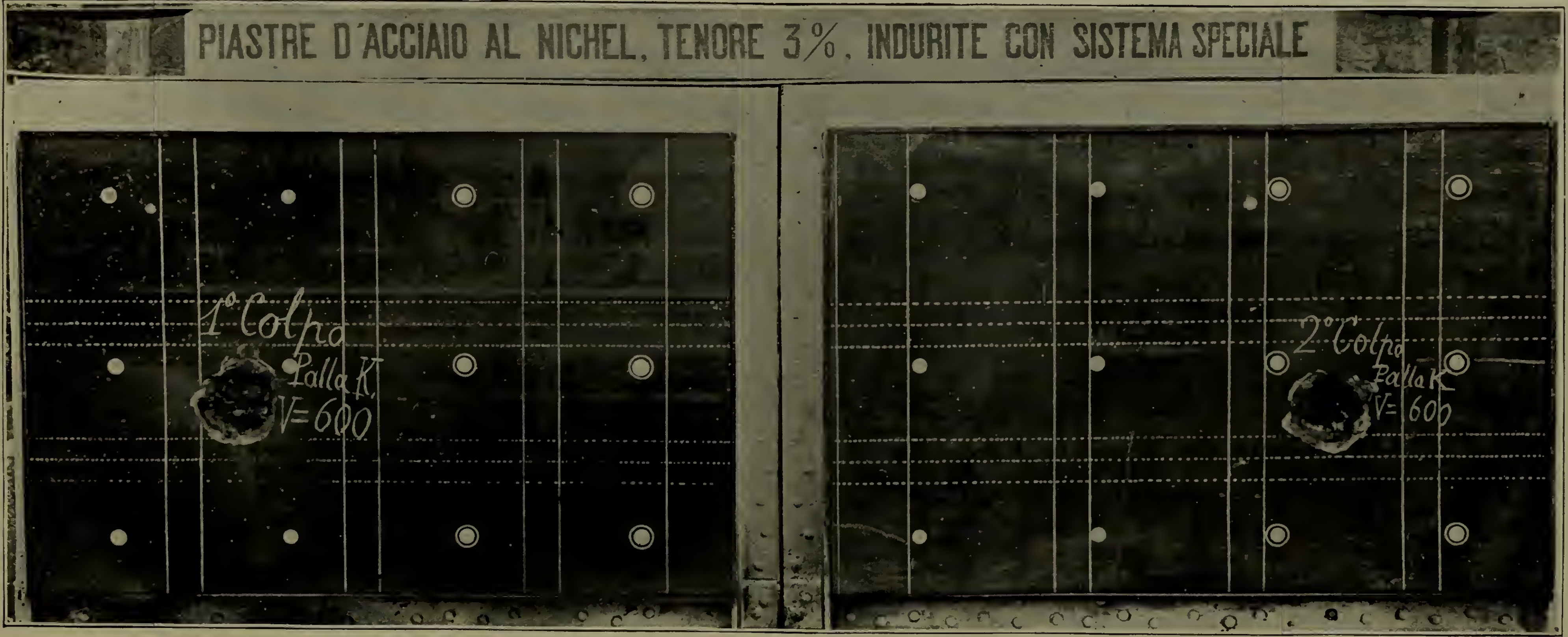
PIASTRE D'ACCIAIO AL NICHEL, TENORE 3%, INDURITE CON SISTEMA SPECIALE
1° Colpo
Palla K
V=600
2° Colpo
Palla K
V= 600

Fig. 2.

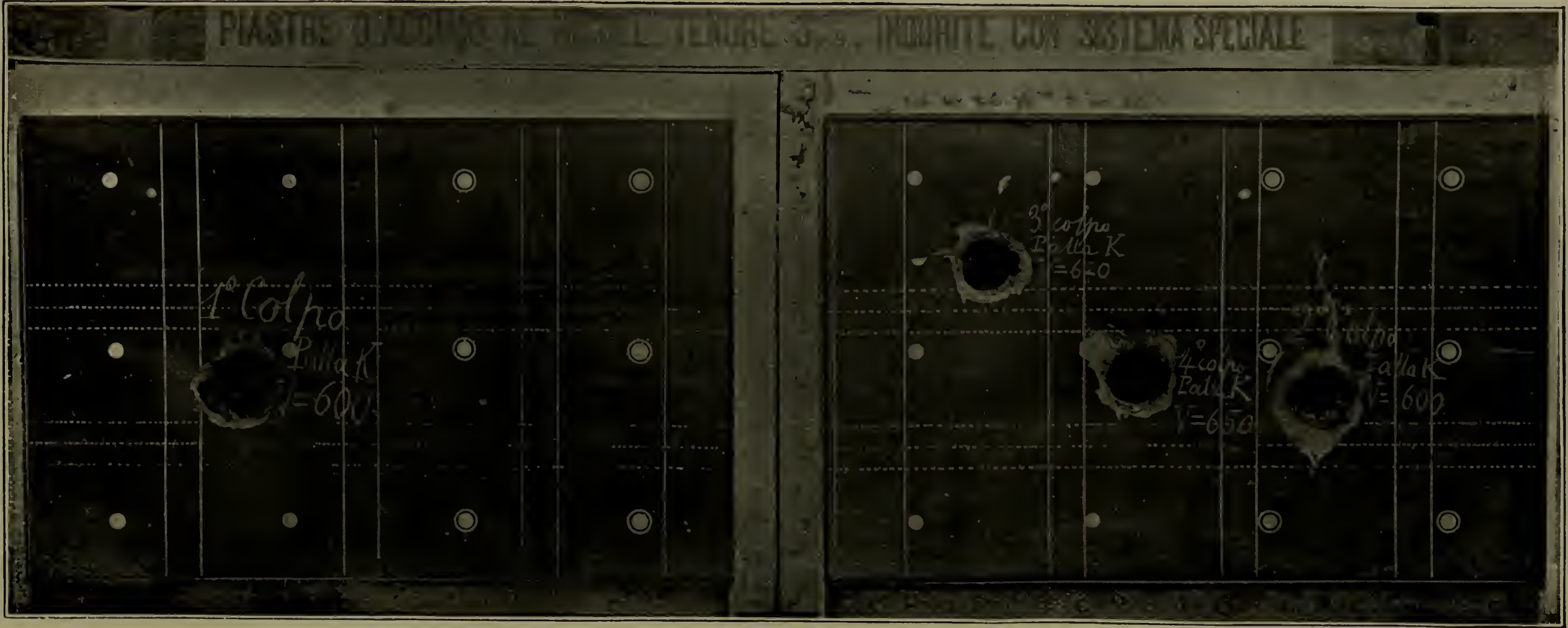
PIASTRE
TENORE
INDURITE CON SISTEMA SPECIALE
1° Colpo
Palla K
=600
3° colpo
Palla K
=6_0
4° colpo
Palla K
V=650
colpo
Palla K
V=600

Fig. 3.

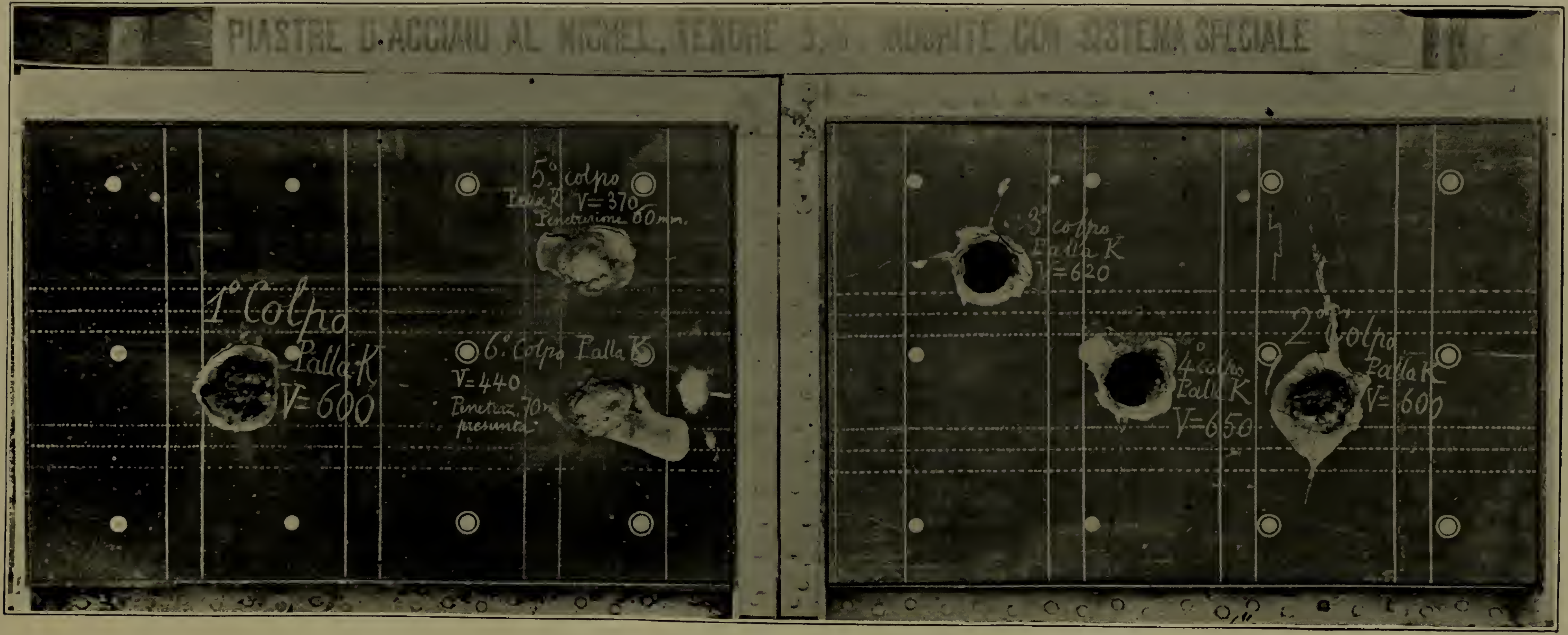
PIASTRE D'ACCIAIO AL NICHEL, TENORE 5.%, INDURITE CON SISTEMA SPECIALE
1° Colpo Palla K V=600
5° colpo Palla K V=370 Penetrazione 60 mm.
6° Colpo Palla K V=440 Penetraz. 70 mm presunta
3° colpo Palla K V=620
4° colpo Palla K V=650
2° Colpo Palla K V=600

Fig. 4.

9.